TCF/LEFs and Wnt Signaling in the Nucleus.

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Public Summary:
TCF/LEF proteins are messengers of Wnt signals, an important communication sent to cells during embryonic development and in stem cell niches in adult tissues capable of regeneration. Wnt signals control many different types of cell behavior including self-renewal and survival in embryonic stem cells and other types of differentiating cells. Recent discoveries have highlighted how TCF/LEFs actions are controlled. Much of the new discoveries have come from comparison of TCF/LEF structure and function in different organisms and in mouse embryonic stem cells, where Wnt regulation of pluripotency has been shown to be critical.

Scientific Abstract:
T-cell factor/lymphoid enhancer factor (TCF/LEF) transcription factors are the major end point mediators of Wnt/Wingless signaling throughout metazoans. TCF/LEFs are multifunctional proteins that use their sequence-specific DNA-binding and context-dependent interactions to specify which genes will be regulated by Wnts. Much of the work to define their actions has focused on their ability to repress target gene expression when Wnt signals are absent and to recruit beta-catenin to target genes for activation when Wnts are present. Recent advances have highlighted how these on/off actions are regulated by Wnt signals and stabilized beta-catenin. In contrast to invertebrates, which typically contain one TCF/LEF protein that can both activate and repress Wnt targets, gene duplication and isoform complexity of the family in vertebrates have led to specialization, in which individual TCF/LEF isoforms have distinct activities.